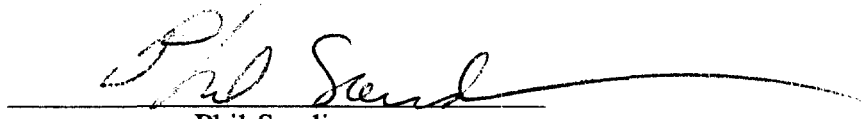
ECOLOGICAL ASSESSMENT REPORT
for the Property Located at
199 Main Street, Lodi, NJ
ISRA Case No. 95400

Prepared for:
Purdue Pharma Technologies

December 30, 2002

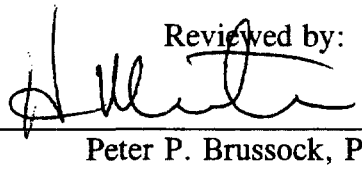
Prepared by:

Environmental Liability Management, Inc.
218 Wall Street, Research Park
Princeton, NJ 08540-1512
www.elminc.com



Phil Sandine
Ecologist No. 450

Reviewed by:



Peter P. Brussock, Ph.D.
Certified Senior Ecologist No. 313
Vice President

877450001

CERTIFICATIONS
N.J.A.C. 7:26E-1.2, *et seq.*

Any person making a submission to the Department required by this chapter and pursuant to N.J.A.C. 7:26E shall include the following signature and notarized certification, for each technical submittal. Additionally, the certification shall indicate the case name and address, case number, type of documents submitted, e.g., Remedial Action Report, for each technical submittal.

TYPE OF DOCUMENT Ecological Assessment Report

CASE NAME Napp Technologies, Inc.

CASE ADDRESS 199 Main Street. Lodi, Bergen County, NJ

CASE NUMBER 95400

The following certification shall be signed by:

1. For a corporation; by a principal executive officer of at least the level office of vice president;
2. For a partnership or sole proprietorship, by a general partner of the proprietor, respectively, or;
3. For a municipality, State, Federal or other public agency, by either a principal executive officer or ranking elected official.
4. For persons other than 1 through 3 above, by the person with legal responsibility for the site.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement that I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties."

PRINTED NAME Robert Loewenstein TITLE Director

SIGNATURE Robert Loewenstein DATE 12/30/02

NOTARY SIGNATURE Rita M. Geoffray DATE 12/31/02

C:\DOCUMENTS AND SETTINGS\LOEWENSR\LOCAL SETTINGS\TEMPORARY INTERNET FILES\OLK5\20116&CERTIFICATIONFORM-ECOASSESSMENTRPT.DOC

TABLE OF CONTENTS

LIST OF FIGURES iv

LIST OF TABLES iv

LIST OF ATTACHMENTS iv

I. INTRODUCTION 1

II. STEP 1 - SCREENING-LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION 2

A. Environmental Setting 3
B. Site Visit 4
C. Parameters of Potential Ecological Concern 5
1. Soil Screening Results 5
2. Ground Water Screening Results 6
3. Surface Water Screening Results 8
4. Sediment Screening Results 12

III. STEP 2 – SCREENING-LEVEL EXPOSURE ESTIMATE AND RISK ESTIMATE 14

A. Ground Water Evaluation of Retained Parameters 15
1. VOCs 15
2. SVOCs 16
3. Metals 16
B. Surface Water Evaluation of Retained Parameters 17
1. Phenol 17
2. Silver 18
C. Sediment Evaluation of Retained Parameters 18
1. Surface Sediment 18
2. Subsurface Sediment 19

IV. STEP 3 – BASELINE RISK ASSESSMENT PROBLEM FORMULATION 20

A. Exposure Pathways 20
B. Assessment Endpoints 21
C. Conceptual Model 22

V. STEP 4 – STUDY DESIGN AND DATA QUALITY OBJECTIVE PROCESS 22

A. Measurement Endpoints 23

VI. STEP 5 – FIELD VERIFICATION OF SAMPLING DESIGN 23

VII. STEP 6 – SITE INVESTIGATION AND ANALYSIS PHASE 24

VIII. STEP 7 - RISK CHARACTERIZATION 24

IX. STEP 8 - RISK MANAGEMENT 28

X. REFERENCES 29

Table A: Parameters Retained for the Various Environmental Media 15
Table B: Summary of Macroinvertebrates Indices at Each Macro Station (ENSR. 1996) 27
Table C: Toxicity Test Summary of Percent Survival and Growth (ENSR. 1996) 27

LIST OF FIGURES

Figure 1: Site Location Map

Figure 2: Saddle River Surface Water and Sediment Sample Locations and Detected Results, July 1998 and March 2002

LIST OF TABLES

Table 1: Ground Water Sample Results for Monitoring Wells Located Along Saddle River

Table 2: Saddle River 1995, 1998 and 2002 Surface Water Sample Results Upstream, Adjacent and Downstream

Table 3: Saddle River 1995, 1996, 1998 and 2002 Sediment Sample Results Upstream, Adjacent and Downstream

LIST OF ATTACHMENTS

Attachment A: Photographs

I. INTRODUCTION

The Purdue Pharma Technologies, Inc. (Technologies) (formerly Napp Technologies, Inc.) facility is located in a primarily commercial section in Lodi, New Jersey (Figure 1). The approximately two-acre site is adjacent to the Saddle River. Industrial activities have been conducted at the site and adjoining properties since the 1800s. Over the last 50 years, activities at the Technologies site were primarily associated with the pharmaceutical, cosmetic and food chemical industries. A narrow section of undeveloped land is present to the west of the site, along the bank of the Saddle River and separated by a fence from the rest of the site. The Saddle River is an urban stream that has undergone a substantial amount of reworking and dredging to relocate its banks and to reduce flooding.

Extensive site investigation activities have been conducted at the Technologies site under the oversight of the NJDEP since 1995. Initial soil, surface water and sediment sampling was conducted to investigate conditions immediately resulting from an explosion and fire that occurred at the site in April 1995 (ENSR. 1997). Macrobenthic invertebrate sampling and toxicity testing of sediment in the Saddle River in the vicinity of the site were also conducted at the request of the NJDEP and USEPA (ENSR. 1996). Additional soil, ground water and surface water sampling was conducted in 1996 and 1998 (ENSR. 1997; ENSR. 1999), and a final investigation of the site, as proposed in the Field Investigation Briefing Paper submitted to the agency on October 16, 2001, was conducted from March through August 2002.

Previous submittals to NJDEP (ENSR. 1996; ENSR. 1997; ENSR. 1999) have provided details regarding the historic site investigation activities. A Remedial Investigation Report (RIR) for the site to be submitted in the first quarter of 2003 will summarize prior site investigations results and provides the results from the most recent investigation conducted by Environmental Liability Management (ELM). Therefore, detailed information concerning each of these previous investigations is not presented in this document; rather, only that information from each data collection event relevant to the ecological assessment is presented.

Constituents are present in soil and ground water at the site at concentrations exceeding NJDEP cleanup criteria. The primary constituents of concern in near surface soils are PAHs, PCBs and metals (primarily copper, but also nickel and arsenic), while volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) are present in ground water and deeper subsurface soils. Due to the close proximity of the site to the river, migration pathways of concern are PCBs and metals in surface water runoff and VOCs via ground water discharge to the river (Figure 1).

Because there are potential migration pathways to an environmentally sensitive area, the Saddle River, the Technical Requirements for Site Remediation require that an ecological assessment be conducted (NJAC 7:26E-3.11(a)). NJDEP guidance for ecological assessment references the USEPA's Eight-step Ecological Assessment Process for Superfund (USEPA. 1997) for sites such as Technologies site.

The guidance provided by the eight-step process has been designed to provide for consistent and technically defensible ecological assessments. The detail required in the process is to be based on professional judgment and site-specific conditions, as well as the extent to which a site has been investigated. An extensive database has been generated for the Technologies site through the site investigative activities that have been ongoing since 1995. Therefore, a high level of detail regarding the ecological assessment can be provided.

An ecological assessment for the subject site based on USEPA's assessment process follows below.

II. STEP 1 - SCREENING-LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

The ecological assessment process relies upon knowledge of the environmental setting and the potential contaminants at the subject site. A detailed description of the site, the history of the former industrial operations and site investigation activities previously were provided to NJDEP in the PA, 1997 RIR/RAW and 1999 RIR/RAW Addendum. This information will be

summarized in the 2003 Remedial Investigation Report (RIR), currently under preparation by ELM.

The first step of the ecological assessment process forms the basis for the design of a site investigation, identifies potential parameters of concern, and incorporates this information into a conceptual site model, which includes fate and transport of the site-related constituents in each medium of concern (Figure 2). During this step, sensitive habitats (aquatic, wetlands and significant terrestrial environs) are identified and species of concern are noted.

Because a detailed level of understanding of site conditions has been developed through the three phases of site investigation conducted at the site, the majority of the tasks typically conducted in this initial screening step have already been performed. Constituent transport pathways and potential ecological receptors have been well-documented, and a detailed conceptual site model has been developed (Figure 2). Relevant site information for the assessment is summarized below.

A. Environmental Setting

The site is located along Main Street in a commercial area in Lodi, New Jersey. All former buildings have been removed and the site is almost entirely covered with concrete building foundations or paving. The largest undeveloped area of the site is the approximately 15-20 foot wide section of the property located adjacent to the Saddle River. This undeveloped area, which is separated from the former areas of operations by a fence, is vegetated with trees and shrubs (Attachment A).

The Saddle River has previously been filled and channelized, and some material was dredged from the river for flood control purposes (ENSR. 1997). The remnants of a dam are located approximately 900 feet downstream of the site; the river is tidal below this area. Storm water from the surrounding urban area discharges to the river at various locations along the river.

B. Site Visit

A site visit was conducted in early spring 2002. Based on the results of the site visit, it can be concluded that no significant terrestrial habitat is present, and that the aquatic habitat and riparian corridor along the river provide only a marginal habitat for aquatic species and wildlife.

No substantial areas of exposed soil or vegetation were observed within the area of former site operations (Attachment A). A row of trees and shrubs is present along the river bank, which is separated from the site by a fence. Due to the steepness of the river bank, which extends both up- and downstream of the property, wetlands are not present along the river adjacent to the site or along the river in the vicinity of the site.

Debris, consisting primarily of concrete and typical urban trash, was found along the bank and within the river (Attachment A). The clarity of the water was good at the time of the site visit. The river bottom is primarily stone and sand (Attachment A). Fish species observed in the vicinity of the Technologies property included smallmouth bass, sunfish, suckers and minnows.

Water depth in the center of the river during base flow is two to three feet. During storm events, the river depth is substantially greater due to the large volume of storm water that discharges into the river from the surrounding and upstream urban development. The fish population in the immediate vicinity of the Technologies site is much less than the fish population in downstream areas where the U. S. Army Corps of Engineers (ACOE) has conducted dredging and channelization in the river. It can be concluded that the fish population in the river adjacent to the Technologies site is limited due to wide variation in flow experienced during storm events and the creation of more favorable habitats by the ACOE activities.

The steep banks along the river in the vicinity of the site, in conjunction with low overhanging tree branches, limit the use of the river by wading birds (Attachment A). Also, the

shallowness of the river in the subject area limits its use by waterfowl. More suitable habitat for wading birds and waterfowl is present upstream and downstream of the site area. In addition, the narrow zone of vegetation along both sides of the river in the vicinity of the site limits use of the riparian corridor by other avian and terrestrial species.

In summary, the site visit documented that no significant terrestrial habitat is present at the site and that the aquatic habitat of the river and the associated riparian corridor adjacent to the site provide marginal habitat for wildlife. Furthermore, no species of concern have been observed at the site, nor are any predicted to occur.

C. Parameters of Potential Ecological Concern

Extensive sampling, consisting of soil, ground water, sediment and surface water sampling, has been conducted at the site. NJDEP directed and/or approved the numerous sampling activities conducted at the site (ENSR. 1996, 1997 and 1999; ELM. 2001). The sampling results for these environmental media are screened against ecological screening criteria below.

1. Soil Screening Results

Several hundred soil samples have been collected at the subject site, and analyzed for a wide variety of parameters, including metals, pesticides, PCBs, VOCs and SVOCs. Almost all samples were collected beneath building foundations, pavement and areas of gravel covering the site. Various metals, PCBs, VOCs and SVOCs (polycyclic aromatic hydrocarbons (PAHs) and dichlorobenzene) were detected above NJDEP soil criteria (see RIR for details). The PCBs, metals and PAHs were found in near surface soils; VOCs, dichlorobenzene and metals were found in deeper subsurface soils.

Under current site conditions, the building foundations and paved areas provide an engineering control for the constituents found in surface soils, eliminating the direct contact exposure pathway and generally preventing constituent transport via surface water runoff.

Because building foundations and pavement cover the constituents found in soil, these constituents are not of ecological concern under current property conditions. In addition, only a few scattered small areas of vegetation occur on the site, and these areas provide insufficient habitat for wildlife (Attachment A). It can be concluded, therefore, that in the absence of wildlife habitat, no significant ecological receptors are present at the site (USEPA. 1997). Based on these specific site- conditions, the direct contact exposure pathway is not complete due to: 1) the presence of existing structures that cover the site; and 2) the absence of significant ecological terrestrial receptors. Therefore, no further ecological evaluation of soil is necessary. Although under current site conditions the majority of soils are covered by building foundations or pavement, there remains a small potential for constituents in soil to be discharged to the river in surface water runoff. There are locations of the site (primarily the historic trench system and some isolated areas in the pavement) where the soils are not completely covered. If site related constituents are discharged to the river via surface water runoff, they would be of potential concern to aquatic ecological receptors.

Constituents that could potentially be transported via this mechanism are those constituents found in surface soils - PAHs, metals and PCBs. This pathway is evaluated below in Sections II.3 and II.4 by assessing surface water and sediment sampling results to determine whether any of the constituents that could potentially be discharged to the river in surface water runoff are found in either medium.

2. Ground Water Screening Results

VOCs, phenols, PCBs and selected metals have been detected above NJDEP Ground Water Quality Standards (GWQS) in ground water samples collected from the site (ENSR. 1999). The detection of metals above the ground water standards were limited to arsenic, lead and nickel. VOCs detected at relatively high concentrations (>1 mg/l) included benzene, chlorobenzene (CB), cis-1,2-dichloroethene (cis-1,2-DCE), methylene chloride, toluene, tetrachloroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA) and vinyl chloride. The PCBs represent the only constituent where bioaccumulation is a potential concern.

Two areas of light non-aqueous phase liquid (LNAPL) occur on the ground water surface at the site. The extent of each area has been defined, and the LNAPL in each has been characterized. One area, located adjacent to the industrial sewer line consists primarily of toluene, with other constituents, including PCBs and chlorobenzene, also present. This LNAPL originates on the adjacent Hexcel property (ENSR. 1999). The second area of LNAPL is adjacent to a former underground storage tank (UST) that was present on the adjacent Fortunato property, and the LNAPL has been identified as waste or fuel oil.

There are also some limited areas where, based on soil sampling and ground water monitoring results, the presence of dense non-aqueous phase liquids (DNAPL) is suspected. The suspected DNAPL consists primarily of tetrachloroethene (PCE) with some traces of chlorobenzene.

Neither the LNAPL nor DNAPL areas extend to the river (ENSR. 1999). Also, as documented by surface water sampling results presented below, constituents associated with the LNAPL and DNAPL are either not detected or are detected at concentrations below ecological screening criteria in surface water.

Parameters detected in ground water are of potential concern if the ground water discharge from the site results in the presence of constituents in the surface water of the adjacent river at concentrations greater than applicable ecological screening criteria.. If, however, the constituents are not present at concentrations greater than the screening criteria in the ground water discharging to the river, they will not be found in the river at concentrations exceeding the ecological screening criteria.

Therefore screening of site ground water focused on results from the six monitoring wells that are located immediately adjacent to the Saddle River - MW-E5, MW-E5D, MW-E6, MW-E12, MW-E13 and MW-E13D (Figure 3) - because these wells represent the quality of the ground water that is most likely discharged to the river. The most recent round of ground

water sampling results for these wells (July 2002) provide the most relevant ground water condition for this evaluation, and were used to perform the evaluation.

VOC Screening Results - Six VOCs were detected in the selected ground water samples above surface water screening criteria; 1,1-dichloroethene (1,1-DCE), chlorobenzene (CB), benzene, ethylbenzene, toluene and xylenes (BTEX) (Table 1). Chlorobenzene was the most prevalent VOC, and was detected above the criterion in five of the six wells. Based on these data, 1,1-DCE, CB and BTEX compounds are retained for further evaluation in Step 2.

SVOC Screening Results - One SVOC, 1,4-dichlorobenzene (1,4-DCB), was detected above the surface water screening criterion in samples from two of the six wells (MW-E13 and MW-E5D) (Table 1 and Figure 3). 1,4-DCB is retained for further evaluation in Step 2.

Metals Screening Results - Three metals, barium, iron and nickel, were detected at concentrations above surface water screening criteria (Table 1). Barium was detected above the criterion in all samples, iron in five of the six samples and nickel in one sample. Barium, iron and nickel are retained for further evaluation in Step 2.

PCB Screening Results - PCBs were not detected in any samples collected from the six wells (Table 1). Therefore, PCBs will not be retained for further evaluation via this pathway.

Summary

Six VOC compounds (1,1-DCE, CB and BTEX compounds), one SVOC (1,4-DCB), and three metals (barium, iron and nickel) were detected in ground water samples above surface water screening criteria and were retained for further evaluation in Step 2.

3. Surface Water Screening Results

Surface water samples were collected under the direction of NJDEP from the river and other locations on site on April 21 and 24, 1995 (ENSR. 1996). The objective of the 1995 surface water sampling was to investigate the impact, if any, from the fire/explosion. Surface water

samples were analyzed for VOCs and SVOCs, PCBs, dieldrin and metals. The 1995 sampling locations were not available. Subsequent surface water sampling was conducted in July 1998 and June 2002.

April 21 and 24, 1995 Data

VOC Screening Results - The only VOC detected above a screening criterion was phenol[1], which was found in two samples identified as Downstream and Midland/River on April 21, 1995 (specific locations of the samples is unknown) at concentrations of 3,200 and 1,200 µg/L, respectively (Table 2). These results exceed the screening criterion of 110 µg/L. Phenol is retained for additional evaluation in Step 2.

SVOC Screening Results - The only SVOC detected was di-n-butyl phthalate, at a concentration of 51 µg/L versus the screening criterion of 35 µg/L in an April 21, 1995 sample identified as Midland/River (Table 2). However, as this SVOC was also detected in the laboratory blank, its detection in the surface water sample is most likely from laboratory contamination and the compound is not retained for additional evaluation.

Metals Screening Results - Four metals, aluminum, barium, lead and manganese, were detected at comparable concentrations above ecological screening criteria in upstream and downstream samples obtained on April 21, 1995 (Table 2). The maximum detected concentration (screening criterion) for these metals were: aluminum 990 µg/L (87 µg/L); barium 109 µg/L (4 µg/L); lead 240 µg/L (2.5 µg/L); and manganese 220 µg/L (120 µg/L). However, these metals were detected at comparable concentrations in both upstream and downstream samples, supporting a conclusion that these constituents are not a result of discharges on or from the Technologies site. Therefore, these constituents are not retained for further evaluation.

---

[1] Phenol was listed under VOCs in the 1995 table provided to ELM. Typically this compound is listed under SVOCs.

Zinc was detected above criterion in one upstream sample at a concentration of 149 µg/L versus the screening criterion of 120 µg/L. However, since the sample was an upstream sample, it is not considered to be associated with the Technologies site and is therefore not retained for further evaluation.

Silver was detected in one downstream sample (specific location unknown) at a concentration of 19 µg/L, which is above the screening criterion of 0.36 µg/L. Therefore, silver is retained for additional evaluation in Step 3.

Results from samples collected on April 24, 1995 were similar to the samples collected on April 21, 1995. Barium, copper, lead and manganese were detected at comparable concentrations above ecological screening criteria in both upstream and downstream samples (Table 2), and zinc was again detected in one upstream sample above the screening criterion (Table 2). However, no other metals were detected above screening criteria.

PCBs and Pesticides Screening Results – Neither PCBs nor dieldrin was detected in any of the April 1995 samples (Table 2).

July 1998 Results

Surface water samples were collected upstream, adjacent to the site and downstream of the site and analyzed for VOCs, metals and PCBs (Table 2). Sampling locations were approved by NJDEP, and are shown on Figure 2 (ENSR. 1999).

Organic compounds, including phenol, were either not detected or detected below ecological surface water screening criteria (Table 2).

Two metals, copper and zinc were detected above screening criteria in upstream and downstream samples (Table 2). However, all results were comparable. All other metal results were below screening criteria (Table 2).

PCBs were not detected.

Based on the results of the July 1998 sampling, constituents were either not detected in downstream surface water samples at concentrations exceeding the ecological screening criteria or were detected in both the upstream and downstream samples above screening criteria at similar concentrations. Therefore, based on the 1998 data, no constituent would require further evaluation.

2002 Results

In 2002, surface water samples were collected upstream, adjacent to the site and downstream of the site, in response to requirements of NJDEP. Sample locations generally corresponded to 1998 sampling locations, but included additional sampling locations (Figure 2), that were proposed to NJDEP in the October 2001 Briefing Paper (ELM. 2001). These samples were analyzed for VOCs and lead.

VOCs were generally not detected and concentrations of detected compounds were all well below screening criteria (Table 2).

Lead was detected only in the SW-9 sample at the low concentration of 2.5 µg/L; the lead screening criteria is 2.5 µg/L (Table 2). SW-9 is a duplicate to SW-6, which is located upstream of the site (Figure 2).

Summary

Based on surface water sampling results collected over a period of seven years (1995–2002), it is concluded that the surface water quality adjacent to the site has been minimally impacted by the site activities. The data strongly support the conclusion that, although a temporary impact occurred at the time of the fire/explosion in 1995, the site has had no continuing effect upon the river. This conclusion is based on:

- The only VOC detected above a screening criterion was phenol in samples collected on April 21, 1995. Subsequent sampling has detected no phenol in any sample.

- Silver, found in only one downstream sample following the fire and explosion, has never been detected again. All other metals detected in downstream samples at a concentration greater than the screening criterion were also found in upstream samples at comparable concentrations.

- PCBs have never been detected in the surface water adjacent to the site.

4. Sediment Screening Results

Sediment samples were collected in 1995, 1996, 1998 and 2002. The objective of the 1995 sampling was to investigate the impact, if any, from the fire/explosion. Samples were analyzed for SVOCs, metals and PCBs. Information regarding the 1995 and 1996 sampling locations was not available.

1995 Results

In 1995, two sediment samples were collected under the direction of NJDEP from the Saddle River (ENSR. 1996); samples were identified as SED-UP (upstream) and SED-DOWN (downstream).

Samples were analyzed for phenol and PCBs. Phenol was not detected. PCBs were detected in the upstream sediment sample at a concentration of 0.2 mg/kg, which exceeds the screening criterion of 0.194 mg/kg (Table 3). PCBs were not detected in the downstream sample.

1996 Results

The 1996 samples were identified as upstream, downstream and outfall. It is suspected that the outfall sample was collected from the river where the facility's storm water pipe discharged at the northwest section of the site. Samples were analyzed for SVOCs, cadmium and PCBs.

Up to 17 SVOCs, specifically polycyclic aromatic hydrocarbons (PAHs), were detected at low concentrations (1.7 mg/kg or less) (Table 3) in the various sediment samples. However, only the benzo(a)pyrene result of 0.55 mg/kg in one downstream sample exceeded a screening criterion. This SVOC is retained for additional evaluation in Step 2.

Neither cadmium nor PCBs was detected in the 1996 samples (Table 3).

1998 Results

In 1998, one sample was collected upstream of the site and three samples were collected from the river at locations adjacent to the site (Figure 2). Surface and subsurface samples were collected from depth intervals of 0-0.3 feet and 0.3-0.6 feet respectively (ENSR. 1999). Samples were analyzed for metals and PCBs.

In the surface sediment samples, copper was detected in the upstream sample at 79 mg/kg; screening criterion of 54 mg/kg, . No other metal was found at a concentration greater than the screening criteria in the surface sediment samples.

Copper was detected at a concentration of 80 mg/kg in one of the three subsurface sediment samples collected adjacent to the site. The only other exceedance of a metal criterion in a subsurface sample was the detection of lead at a concentration of 79 mg/kg in a sample collected adjacent to the site; screening criterion of 69 mg/kg (Table 3). Lead and copper are retained for further evaluation.

PCBs were detected above the screening criterion of 0.194 mg/kg in the upstream surface sediment sample (1.21 mg/kg) and in one surface sediment sample (0.36 mg/kg) collected adjacent to the site. The concentration of PCBs is approximately 4 times greater in the upstream sample than in the down stream sample, resulting in the conclusion that the PCBs in the sample collected adjacent to the site originate upstream. PCBs were not detected in any of the subsurface sediment samples (Table 3).

2002 Results

In 2002 sediment samples were collected from upstream, adjacent to, and downstream of the site (Figure 2) and were analyzed for PCBs. PCBs were not detected in any of the 2002 sediment samples (Table 3).

Summary

Benzo(a)pyrene (BAP) was detected above the screening criterion in one surface sediment sample, and lead and copper were each detected above their respective screening criterion in one subsurface sediment sample collected adjacent to the site. These parameters are retained for further evaluation in Step 2 below.

III. STEP 2 – SCREENING-LEVEL EXPOSURE ESTIMATE AND RISK ESTIMATE

In Step 2, risk is evaluated by comparing maximum exposure concentrations with ecological screening criteria. Dependent upon the results of Step 2, one of two Site Management Decision Points is reached (USEPA. 1997). Either the assessment is adequate to determine that ecological threats are negligible or the process should continue. Based on the information presented below, the ecological threat is negligible.

The maximum concentrations exceeding ecological screening criteria in environmental media determined to be of potential concern to ecological receptors are listed below and then subject to further evaluation below. For ground water, parameters detected above a screening criterion in one or more of the six wells located along the river were retained. For surface water and sediment, parameters detected above a screening criterion in samples collected from adjacent to or downstream of the site were retained, but if concentrations in upstream samples were comparable, then the parameter was not retained. The parameters retained for the various environmental media sampled are listed below, along with the maximum concentrations and screening criteria.

Table A: Parameters Retained for the Various Environmental Media

Environmental Media	Parameter (maximum result)	Screening Criterion
1. Ground Water	1,1-DCE (190 µg/L)	25 µg/L
	Benzene (1,100 µg/L)	130 µg/L
	Ethylbenzene (30 µg/L)	7.3 µg/L
	Toluene (210 µg/L)	9.8 µg/L
	Xylene (75 µg/L)	13 µg/L
	Chlorobenzene (5,800 µg/L)	64 ug/l
	1,4-dichlorobenzene (75 µg/L)	15 µg/L
	Barium (848 µg/L)	4 µg/L
	Iron (35,700 µg/L)	1,000 µg/L
	Nickel (56 µg/L)	52 µg/L
2. Surface Water	phenol (3,200 µg/L)	110 µg/L
	Silver (19 µg/L)	0.36 µg/L
3. Sediment	benzo(a)pyrene (0.55 mg/kg)	0.44 mg/kg
	Copper (80.1 mg/kg)	54 mg/kg
	Lead (79 mg/kg)	69 mg/kg

The maximum value is used only for screening purposes and to identify the Contaminants of Potential Ecological Concern (COPECs). The maximum values are not used to determine significant risks for potential receptors.

A. Ground Water Evaluation of Retained Parameters

Six VOCs, one SVOC and three metals were retained for ground water due to exceedance above surface water screening criteria. These parameters are further evaluated below.

1. VOCs

Six VOCs, 1,1-dichloroethene (1,1-DCE), chlorobenzene, benzene, ethylbenzene, toluene and xylenes were retained for ground water. These compounds are of ecological concern if the discharge of ground water to the Saddle River results in exceedances of surface water screening criteria.

As documented above in Step 1, VOCs were not detected at concentrations above screening criteria in surface water samples collected from the river in 1995 and 2002, nor in sediment samples collected in 1996. Consequently, it is concluded that VOCs ground water at the site have not had a significant impact on aquatic ecological receptors. Furthermore, planned remedial actions (e.g., source removal) will further reduce any potential for VOCs in ground water to affect the quality of the Saddle River.

Based on the preceding findings, it is reasonable to conclude that no further evaluation is warranted regarding VOCs detected in ground water above ecological screening criteria.

2. ***SVOCs***

One SVOC, 1,4-dichlorobenzene (1,4-DCB), was retained because of detections above the screening criterion in two of the six ground water samples collected from wells located along the river. However, as documented above in Step 1, 1,4-DCB was not detected at a concentration above the screening criterion in surface water samples or sediment samples collected from the river. Consequently, the occurrence of this SVOC at concentrations in ground water at the site above its screening criterion has not had a significant impact on aquatic ecological receptors. Furthermore, as with the VOCs discussed previously, the planned remedial actions to address ground water (e.g., source removal) will further reduce any potential for 1,4 DCB in ground water to affect the quality of the Saddle River.

Based on the preceding findings, it is reasonable to conclude that no further evaluation is warranted regarding the 1,4 DCB detected in ground water above the ecological screening criterion.

3. Metals

Three metals, barium, iron and nickel, were retained during the screening conducted in Step 1 above because they were detected in ground water at concentrations greater than the screening criteria However, as documented above in Step 1, these metals were not detected at concentrations above screening criteria in surface water samples or sediment samples collected

from the river. Consequently, the occurrence of these metals at concentrations in ground water at the site above an ecological screening criterion have not had a significant impact on aquatic ecological receptors. It is further noted that barium and iron can naturally occur at concentrations above the screening criteria (USEPA. 1986).

Based on the preceding findings, it is reasonable to conclude that no further evaluation is warranted regarding metals detected in ground water above surface water screening criteria.

B. Surface Water Evaluation of Retained Parameters

Phenol and silver were retained for surface water because they were detected at concentrations greater than their respective surface water screening criterion. Phenol and silver are further evaluated below.

1. *Phenol*

Phenol was detected above the surface water screening criterion in surface water samples collected during the day of the fire/explosion of April 21, 1995. However, phenol was not detected in any subsequent surface water sample collected and analyzed for this parameter. Furthermore, in sediment samples, phenol was either not detected or detected at levels well below the sediment screening criteria.

Based on the above findings, it is reasonable to conclude that the detection of elevated concentrations of phenol in surface water samples collected only the day of the fire/explosion represented a temporary condition that was associated with the unique conditions at the site on that one day (e.g., substantial flow of surface water from the site due to fire fighting activities). Consequently, it is concluded that this temporary condition did not have a significant impact on aquatic ecological receptors, and there is no ongoing presence of phenol in surface water.

Based on the proceeding findings no further evaluation is warranted regarding the one time detection of phenol above the screening criterion in 1995.

2. *Silver*

Silver was detected above the screening criterion in the downstream surface water sample collected on the day of the fire/explosion. In the surface water samples collected downstream of the site three days after the fire/explosion, silver was not detected. Furthermore, silver was not detected in sediment samples analyzed for this metal. Therefore, it is concluded that the one detection of silver in surface water samples collected the day of the fire/explosion represented a temporary condition that was, as with the phenol discussed previously, associated with discharges to the river from fire fighting activities. Consequently, it can be expected that this temporary condition did not have a significant impact on aquatic ecological receptors.

Based on the preceding findings, the one detection of silver represented an insignificant, temporary occurrence. Therefore, silver is not a parameter of ecological concern in the surface water of the Saddle River adjacent to the subject site, and no additional evaluation is warranted.

C. Sediment Evaluation of Retained Parameters

Benzo(a)pyrene was retained for surface sediment, and lead and copper were retained for subsurface sediment. These two parameters are further evaluated below.

1. *Surface Sediment*

Benzo(a)pyrene, was detected at a concentration of 0.55 mg/kg, which is marginally above the 0.44 mg/kg screening criterion. Benzo(a)pyrene was also detected in the upstream sample at a concentration of 0.22 mg/kg. In addition, other PAHs were detected at comparable concentrations in both the upstream and downstream samples (Table 3). The detection of numerous PAHs in sediment of an urban river is expected because PAHs are common constituents in urban runoff (Water Environment Federation. 1998). As discussed previously, the Saddle River receives surface water runoff from numerous sources, including roads and parking areas, in which PAHs and other constituents are present. Consequently, the most likely source of the PAHs detected in the sediment samples is generalized urban runoff.

Based on the preceding findings, it is concluded that benzo(a)pyrene in the sediment of the Saddle River adjacent to the subject site is not a parameter of ecological concern associated with the Technologies site. This conclusion is corroborated by the results of the sediment toxicity testing which are discussed later in this assessment.

2. ***Subsurface Sediment***

Lead and copper were detected above their respective screening criterion in subsurface sediment samples. Lead was detected at a concentration of 79 mg/kg, which is marginally above the 69 mg/kg screening criterion, while copper was detected at 80 mg/kg, again only slightly greater than the screening criterion of 54 mg/kg.

Lead is a documented constituent in urban runoff (Water Environment Federation. 1998; Whipple. 1976). As discussed previously, the Saddle River receives a great amount of urban runoff along its length. Consequently, the most likely source of the lead detected in the sediment samples is runoff from the urban areas of Lodi. Further, there is no confirmed use of lead at Technologies site, and lead is not a constituent found in either soil or ground water at the site.

Copper was found in one subsurface sample adjacent to the site. But as noted above, it was detected above the screening criterion in a surface sediment sample located upstream of the site.. It was not found in the other subsurface samples or in surface sediment samples collected adjacent to the site.

Copper is a documented constituent in urban runoff (Water Environment Federation. 1998; Whipple. 1976) and is also found in near surface soils on the Technologies site. Therefore, a source of the copper found in the subsurface sediment sample may be historic runoff from the Technologies site. However, as stated above, copper was not found in the surface sediment at a concentration greater than the screening criterion except in an upstream sample. It is concluded that no ongoing discharge of copper is occurring to the river from the site. Also, as discussed below, the results of the sediment toxicity testing shows that the isolated detection of

copper at a concentration slightly above the screening criterion has not adversely affected the sediment.

In summary, the evaluation of the comparison of sampling results to ecological screening criteria present documents that the ecological threats are negligible and therefore, pursuant to the eight-step process, no additional evaluation would be required. However, because additional assessment activities were completed, and the results of these activities further support the conclusion that discharges from the Technologies site have not had a significant ecological impact upon the Saddle River, the evaluation is continued beyond Step 2.

IV. STEP 3 - BASELINE RISK ASSESSMENT PROBLEM FORMULATION

The Problem Formulation step typically includes various activities such as selecting assessment endpoints, further characterizing ecological effects of contaminants, refining information on contaminant fate and transport, and developing a conceptual model to determine questions/data gaps to be addressed in subsequent site investigation activities. However, as previously detailed above, the majority of these activities have already been conducted. Extensive site investigation activities have been conducted at the Technologies site and the adjacent Saddle River. In addition, at the request of the NJDEP, sediment samples were collected from the Saddle River for macrobenthic evaluation and testing. Therefore, the Step 3 activities for this assessment are focused on defining exposure pathways, assessment endpoints and presentation of the conceptual model.

A. Exposure Pathways

Because terrestrial habitats have been eliminated by the long-term industrial use of the site, it is unrealistic to expect that potential terrestrial ecological receptors will use the property. Therefore, the direct contact exposure pathway for terrestrial species has not been retained as one of potential concern. However, due to the hypothetical potential for transport of PCBs and/or metals in soil via surface water runoff and migration of PCB and/or VOC impacted ground water to the Saddle River located adjacent to the site, there is some potential for sediment and surface water in the river to be exposure points due to runoff and ground water

flow pathways. As discussed previously, however, the surface water and sediment sampling that has been performed support a conclusion that these transport mechanisms do not generally represent an ecological threat. This is because the vast majority of constituents for which this pathway could apply are not present above screening criteria in either surface water or sediment, and those constituents that have been found above their respective screening criteria are no longer found or found in only a single sample (phenol, silver, copper), or are the result of urban runoff (B(a)P), lead and copper).

As further discussed above, these results would typically support a conclusion that no additional evaluation is necessary. However, because additional work has already been performed, the results of these activities are presented below.

B. Assessment Endpoints

As previously discussed, no ecologically significant receptors occur at the site, due to the almost complete lack of habitat at the site and in the adjacent urban development. Furthermore, the habitat of the Saddle River in the vicinity of the site is degraded, due to prior channelization and filling of the riparian corridor. Therefore, there is limited use of the site and adjacent river by terrestrial or waterfowl species.

However, due to the hypothetical potential for an impact on the river, a relevant assessment endpoint is fish. Relevant to the fish community is the condition of the aquatic invertebrate community. Specifically, the aquatic invertebrate community is sensitive to localized impacts and the fish community is directly connected to the invertebrate community through the food chain. Therefore, an appropriate measurement end point is the aquatic invertebrate community. Evaluation of this community can be accomplished through a benthic community analysis and through sediment toxicity testing using invertebrates. Sediment testing was performed, and the results are presented in Section VIII.

C. Conceptual Model

The Conceptual Model provides an overview of the fate and transport of site-related constituents from the primary source area(s) to the ultimate discharge location. From an ecological perspective, the primary mechanisms by which constituents could be discharged to the Saddle River are surface runoff, discharge of ground water and the migration of LNAPL and DNAPL to the river. Typically, this phase of the evaluation would identify those actions necessary to evaluate whether these potential mechanisms are actually resulting in an impact to the ecological receptor. However, because of the extensive site investigation activities that have been conducted at the site, the data necessary for this evaluation have already been collected.

For example, neither LNAPL nor DNAPL extend to monitoring wells located along the river bank or river. Furthermore, constituents detected in the LNAPL and DNAPL are either not detected or are detected at concentrations below ecological screening criteria in both upstream and downstream samples. These data demonstrate that the ecological impacts of the constituents found in the LNAPL and DNAPL are minimal, and that there are sources of these constituents besides Technologies. It should be noted that Technologies is committed to removal/treatment of the primary source areas on the property, including the LNAPL and DNAPL, as ground water remediation actions, and that these actions will further reduce the potential for any adverse ecological threat from the property.

V. STEP 4 - STUDY DESIGN AND DATA QUALITY OBJECTIVE PROCESS

In Step 4, measurement endpoints to evaluate whether an ecological impact is present are typically established. In addition, during this step, the details of any relevant site investigation activities that may be needed to supplement the existing data are developed. However, as previously noted, extensive site investigation activities were conducted at the site and in the Saddle River in coordination with the NJDEP. Additionally, a measurement endpoint, the macrobenthic invertebrate community, was selected as a representative endpoint by which to evaluate the condition of the Saddle River in the immediate vicinity of the Technologies site.

A. Measurement Endpoints

As determined above, the aquatic benthic invertebrate community was selected as an appropriate measurement endpoint. Consistent with the selection of this measurement endpoint is the selection of the fish community for the assessment endpoint; the aquatic invertebrate community is sensitive to localized impacts and the fish community is directly connected to the invertebrate community through the food chain. Appropriate measurement endpoints are a comparison of the macrobenthic community in the river downstream of the site to the community just upstream of the site, which provides comparative data upon which to base a conclusion as to whether conditions just downstream of the site are different than those immediately upstream area. Additionally, sediment toxicity testing provides a direct measure of any affect the sediment may be having on the macrobenthic community.

The two measurement endpoints were examined as a result of prior requests by the NJDEP. The results of the macrobenthic sample analysis demonstrate that the benthic community downstream of the site is similar to the benthic community upstream of the site (ENSR. 1997). This finding is consistent with the surface water and sediment sampling results, which document that there is no measurable impact on the quality of these two environmental media in the river due to the subject site (Section III).

VI. STEP 5 - FIELD VERIFICATION OF SAMPLING DESIGN

In the typical eight-step process, Step 5 is used to verify that the field sampling plan developed in Step 4 is adequate to collect the necessary data to support conclusions regarding the selected measurement endpoints, and can be implemented at the site. As previously discussed, extensive sampling was conducted at the site and in the river adjacent to the site in coordination with NJDEP. These sampling activities thoroughly characterized the environmental condition at the site and in the river adjacent to the site. In addition, at the request of the NJDEP, sediment samples were collected from the Saddle River for macrobenthic evaluation and testing. Therefore it is reasonable to conclude that no additional field work is technically warranted to complete this ecological assessment and consequently no further action under Step 5 is required.

VII. STEP 6 - SITE INVESTIGATION AND ANALYSIS PHASE

Typically, information for screening potential ecological effects is compiled under Steps 1 and 2. Then, at Step 6, a focused site investigation is conducted to fully characterize existing ecological impacts and obtain additional exposure-response information. However, as previously discussed, extensive site investigation work has been completed which has fully characterized the environmental condition at the site for the period from 1995 to 2002 as reported in this assessment and elsewhere (ENSR. 1996, 1997 and 1999). Furthermore, the section of the adjacent Saddle River was thoroughly investigated through surface water and sediment sampling and analyses. Therefore, no additional activities are required under this step to complete the ecological assessment.

VIII. STEP 7 - RISK CHARACTERIZATION

In this step, data on exposure and effects are integrated into a statement about risk to the assessment endpoints previously established. For the subject site, the assessment endpoint was the fish community in the Saddle River.

Three lines of evidence were used to evaluate the assessment endpoint; comparison to screening levels for potential biological effects, macrobenthic invertebrate community analysis and toxicity testing. Results are summarized below.

Comparison to screening levels - Sampling results from monitoring wells located at the site along the Saddle River were screened against ecological surface water criteria to evaluate the potential impact from ground water discharges (Table 1). Data from surface water and sediment samples collected from the Saddle River were screened against conservative ecological screening criteria (Tables 2 and 3). Constituents found in these environmental media at concentrations greater than the ecological screening criteria were evaluated in Section III. Based on the evaluations in Section III, it was determined that the limited number of constituents found at concentrations greater than the screening criteria in surface water and sediment samples were either temporary (phenol and sliver - limited to the day of the fire/explosion), not associated with the site (PAHs, lead and copper - due to urban runoff), or

found in only an isolated location at a concentration slightly above the screening criterion (copper). The results are summarized below.

- **Screening of Ground Water Sampling Results** – Ground water samples were collected from six monitoring wells located on site along the Saddle River. Six VOCs, 1,1-dichloroethene (1,1-DCE), chlorobenzene, benzene, ethylbenzene, toluene and xylenes (BTEX), and one SVOC, 1,4-dichlorobenzene were detected above the ecological screening criteria. Only three metals (barium, iron and nickel) were found at a concentration greater than the ecological screening criteria. None of these organic or inorganic parameters was detected in surface water or sediment samples above screening criteria (see below). These data document that there is no measurable impact on the river from site ground water discharges. This conclusion is supported by the sediment toxicity testing results, which documented that the sediment is not toxic.

- **Screening of Surface Water Sampling Results** – Except for a detection of phenol on the day of the fire, organic compounds were found in upstream and downstream surface water samples at comparable concentrations, and all detections were below the ecological screening criteria. These results document that any effect on the river from ground water discharges is very low, and that, in addition to potential discharges from the Technologies site, other regional sources are also discharging to the river. Phenol was not detected in any surface water samples obtained following the day after the fire, and was never found in sediment samples. None of the VOCs detected in surface water at the site are known to bioaccumulate in the food chain.

  Inorganic constituents were detected in upstream and downstream samples at comparable levels with the exception of silver, which was found in one sample collected the day following the fire. Silver is not a metal of concern in soil at the site (ENSR. 1999), nor was it detected in sediment samples (Table 3).

- **Screening of Sediment Sampling Results** - Sediment samples contained only benzo(a)pyrene at a concentration above the ecological screening criteria. In subsurface sediment samples, lead and copper were detected above screening criteria. These three constituents were all found in only isolated samples at concentrations marginally above their respective screening criteria (Table 2). Because lead, copper and PAHs are ubiquitous in urban streams (Water Environment Federation. 1998), and the Saddle River receives large volumes of urban runoff along its length, it is concluded that the lead, copper and benzo(a)pyrene most likely result from urban runoff, and not from site operations. However, the detection of copper in one subsurface sediment sample adjacent to the site may in part be a result of historic runoff from the site but, since it is not found in surface sediment at a concentration above the screening criterion and the site is now almost entirely covered with either building foundations or pavement, it can be concluded that there is no further discharges of copper to the river. Copper is not found in surface water samples, so the only ecological pathway is the sediment itself. As discussed below, sediment toxicity testing supports the conclusion that the copper is not creating harm to the ecological receptors.

Macrobenthic Invertebrate Community Sampling - Benthic samples were collected from NJDEP approved locations upstream and downstream of the site. As reported by ENSR, results were comparable between the two sample locations. Additionally, ENSR reported that the density and diversity of organisms were generally low at both locations (ENSR. 1997), which is not unexpected considering that the section of river being evaluated has historically been filled and channelized for flood control, experiences extreme variations in flow as a result of storm water runoff, and is located in a highly urbanized area.

Table B: Summary of Macroinvertebrates Indices at Each Macro Station (ENSR. 1996)

Percentage of Organisms	UL-1 Upstream	UL-2 Upstream	DL-1 Downstream	DL-2 Downstream
% Ephemeroptera	0%	0%	0%	0%
% Plecoptera	0%	0%	0%	0%
% Ephmeroptera, Plecoptera & Tricoptera	0%	0%	0%	0%
% Chironomidae	37.5%	52.3%	10.8%	42.1%
% Dipertera	62.5%	61.4%	29.7%	50.0%
% Isopoda	6.3%	0%	0%	5.3%
% Oligochaeta	31.2%	38.6%	70.3%	44.7%

The % Chironomidae are included in the % Dipertera.

Sediment Toxicity Testing - Sediment samples were collected from the Saddle River at locations selected by the NJDEP that were upstream and downstream of the site (ENSR. 1997). The samples were subject to toxicity testing using *Daphnia magna* (acute test) and *Hyalella azteca* (chronic test). In the acute tests, ENSR reported that there was 100% survival. In the chronic tests, the reported survival rates were comparable for the upstream and downstream sediments at 91% and 88%, respectively; survival rate for the control was reported at 81%. No site-related effects were detected in either test.

Table C: Toxicity Test Summary of Percent Survival and Growth (ENSR. 1996)

Sample	SED-UP Upstream	SED-Down Downstream	Control Sample
Percent Survival	91%	88%	81%
Mean Dry Weight (mg)	0.30	0.17	0.12

Risk Characterization Summary – The screening of surface water and sediment sample results with conservative ecological screening criteria determined that there is no significant exposure to aquatic organisms to those parameters that occur at elevated levels in soil and

ground water at the subject site. Toxicity testing of sediment collected from upstream and downstream of the site documented no toxicity at either location.

Consistent with the toxicity test result, the benthic community evaluation documented that community structure is similar at locations both upstream and downstream of the site. This is predicted given that site related parameter detections did not exceed screening levels and that the sediment was determined not to be toxic through toxicity testing.

Since the local urban fish community is dependent upon the macroinvertebrate community and generally less sensitive to toxicity testing than the aquatic invertebrates, fish community assessment endpoint is unimpacted by the Napp site. It is noted that other factors account for a limited fish community near the Napp Property, such as frequent high discharge flooding and habitat degradation, due to channel dredging for flood control.

In summary, ELM concludes that there are no measurable impacts to ecologically relevant receptors in the Saddle River due to the subject site.

Uncertainty Analysis – The ground surface at the Napp property is stable (covered with concrete foundations and pavement) and does not pose a significant threat to ecologically relevant receptors. However, if site soils containing PCBs or other site-related chemicals were destabilized by remediation or construction activity, aquatic receptors may be impacted by the runoff of sediment in storm water. In addition, hydrology changes could cause movement of LNAPL of DNAPL that may concentrate flow of NAPL or dissolved VOCs to seep areas along the river yielding unacceptable concentrations in the river. Consequently, the evaluation of remedial alternatives for chemicals remaining on the property should consider the potential adverse effects on ecological receptors in the river.

IX. STEP 8 – RISK MANAGEMENT

Under Step 8, the goal is to balance any need for risk reduction with the risks that would result from a remedial action, if it is determined that there is a need to reduce risk. Specific to the

subject site, three lines of evidence - use of screening criteria, biological community evaluation and toxicity testing - support the finding that no remedial action is required at the subject site to protect potential ecological receptors on the industrial property or adjacent river under current site conditions. Consequently no remedial action is technically warranted at the subject site to protect potential ecological receptors and no further action is required under the Technical Requirements for Site Remediation regarding potential ecological receptors at the site.

Although the finding of this assessment is that no remedial action is necessary regarding potential ecological receptors, Technologies is evaluating remedial actions to address the constituents found in ground water, and to prevent direct contact with constituents found in soil. Implementation of the remedial actions to address source areas will further control and mitigate any potential for impacts to ecological receptors resulting from ground water discharges to the river, and the engineering controls will prevent constituent contact with surface water runoff.

X. REFERENCES

ELM. 2001. Field Investigation Briefing Paper dated October 16, 2001.

ENSR. 1999. Remedial Investigation Report/Remedial Investigation Workplan Addendum dated June 1999.

ENSR. 1997. Remedial Investigation Report/Remedial Investigation Workplan Addendum dated June 1997.

ENSR. 1996. Preliminary Assessment Report for Napp Technologies, Inc.

Jones, D.S., G.W. Suter and R.N. Hull. 1997. Oak Ridge National Laboratory. ES/ER/TM-95/R4.

NJDEP. 1998. Guidance for Sediment Quality Evaluations.

Suter, G.W. and C.L. Tsao. 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota, Oak Ridge National Laboratory. ES/ER/TM-96/R2.

USEPA. 1999. National Recommended Water Quality Criteria. EPA 822-Z-99-001.

USEPA. 1997. Ecological Risk Assessment Guidance for Superfund Process for Designing and Conducting Ecological Risk Assessments. Interior Fund. EPA 540/R-97/206.

USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001.

Water Environment Federation. 1998. Urban Runoff Quality Management. Published by a Joint Task Force of the Water Environmental Federation and American Society of Civil Engineers. pp. 259.

Whipple, W., J.V. Hunter and L.Y. Shaw. 1976. Characterization of Urban Runoff - New Jersey. Water Resources Research Institute, Rutgers University.

ATTACHMENT A

Photographs

Photograph 1: River bank at surface water sample location SW-8 (DCP_0149.jpg)

Photograph 2: Opposite river bank at surface water sample location SW-8 (DCP_0150.jpg)

Photograph 3: River bank at surface water sample location SW-7 (DCP_0151.jpg)

Photograph 4: Opposite river bank at surface water sample location SW-8 (DCP_0152.jpg)

Photograph 5: River bank at surface water sample location SW-1/SED-1 (DCP_0153.jpg)

Photograph 6: Opposite river bank at sample locations SW-1/SED-1 (DCP_0154.jpg)

Photograph 7: River bank at surface water sample location SW-2/SED-2 (DCP_0155.jpg)

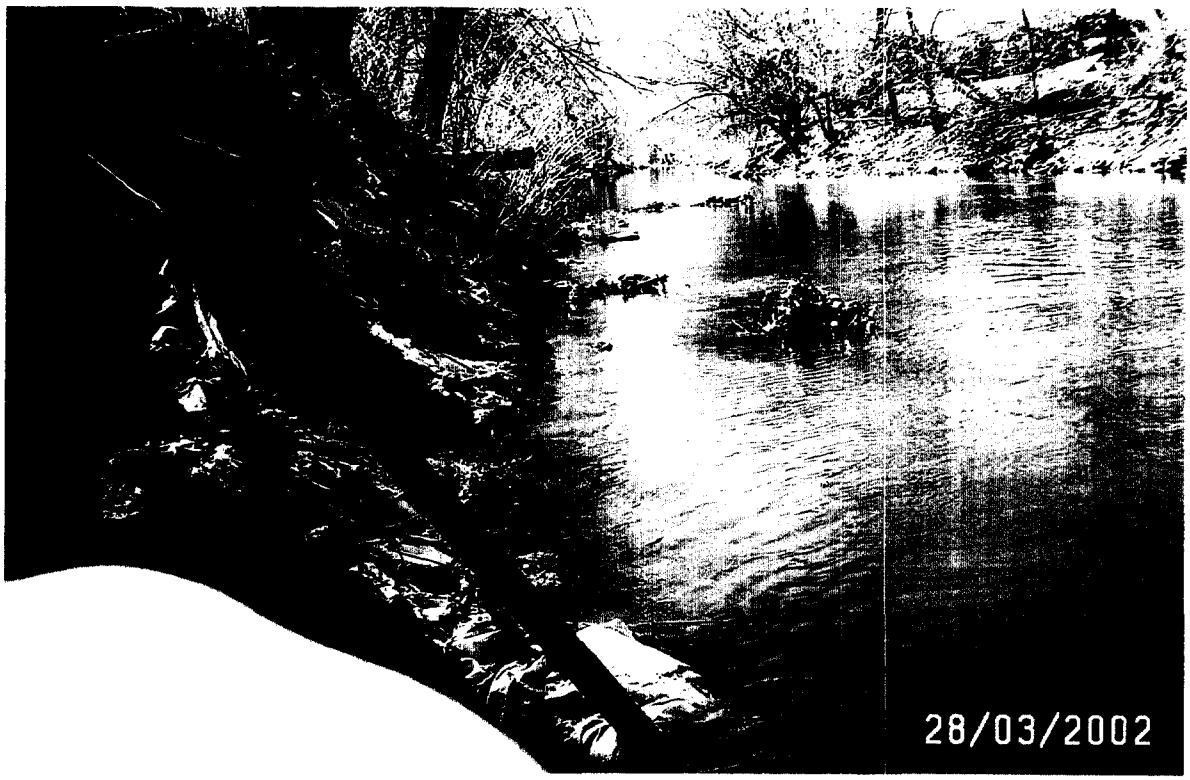
Photograph 8: Opposite river bank at sample locations SW-2/SED-2 (DCP_0156.jpg)

Photograph 9: River bank at surface water sample location SW-3/SED-3 (DCP_0157.jpg)

Photograph 10: Opposite river bank at sample locations SW-3/SED-3 (DCP_0158.jpg)

Photograph 11: River bank at surface water sample location SW-4/SED-4 (DCP_0161.jpg)

Photograph 12: Opposite river bank at sample locations SW-4/SED-4 (DCP_0162.jpg)



Photograph 13: River bank at surface water sample location SW-5/SED-5 (DCP_0164.jpg)

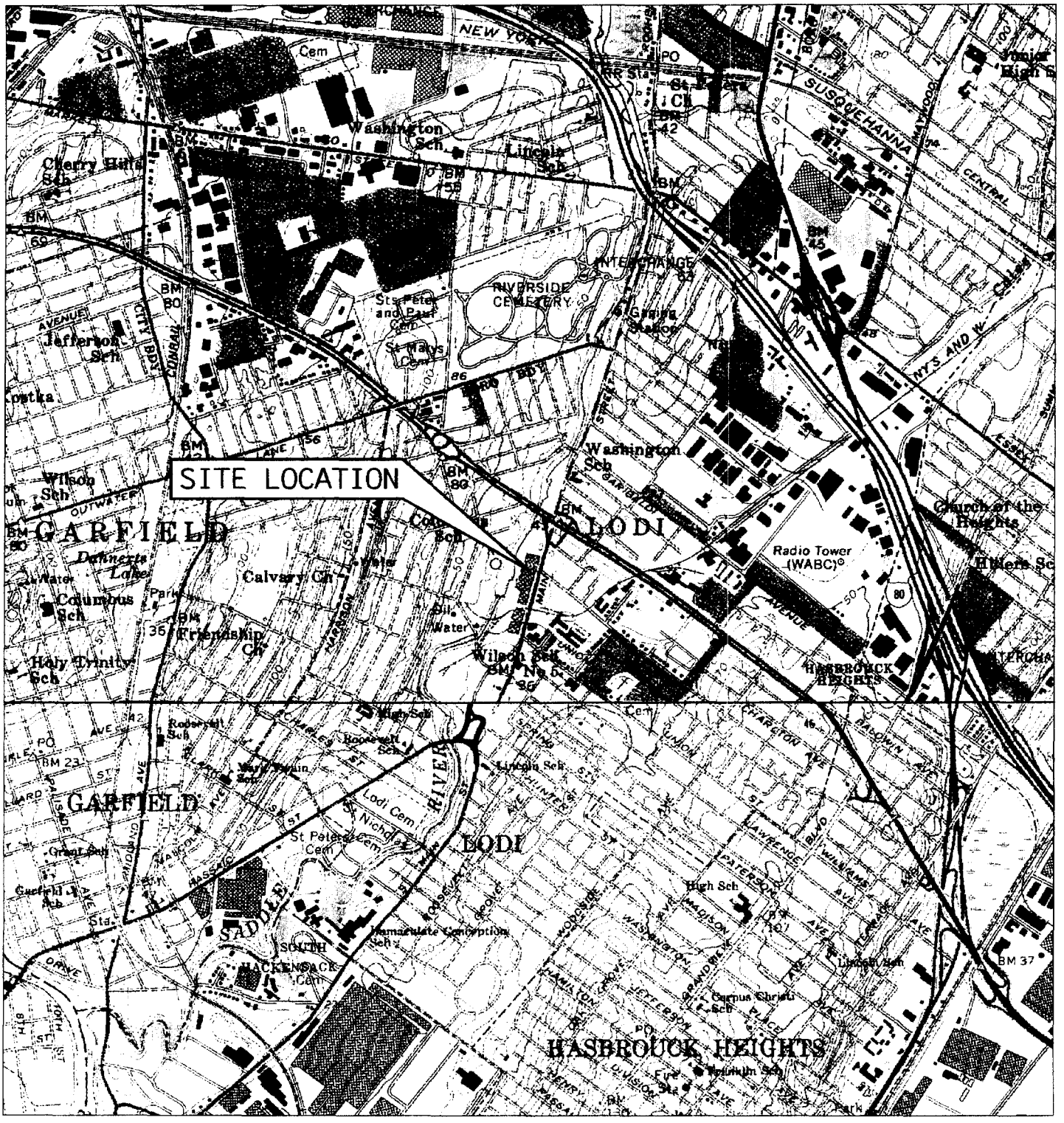
Photograph 14: Opposite river bank at sample locations SW-5/SED-5 (DCP_0165.jpg)

Photograph 15: Downstream view at sample location SW-6/SED-6 (DCP_0168.jpg)

Photograph 16: Upstream conditions at sample location SW-6/SED-6 (DCP_0167.jpg)

FIGURES

877450045



0 2,000 4,000

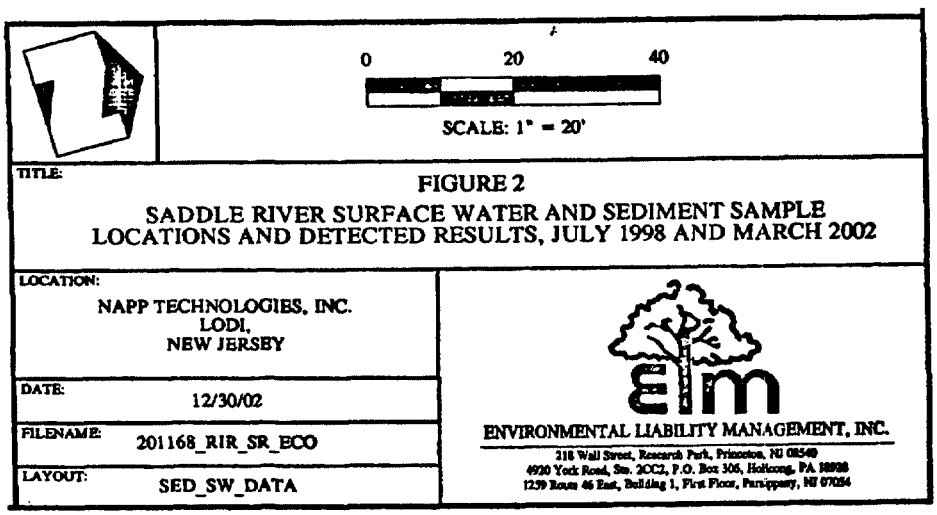
SCALE: 1" = 2,000'

TITLE:	FIGURE 1 SITE LOCATION MAP
LOCATION:	NAPP TECHNOLOGIES, INC. 199 MAIN STREET LODI, NEW JERSEY
DATE:	7/16/01
PROJECT NO.:	201168
FILENAME:	201168_SITELOC
SOURCE:	USGS TOPO, HACKENSACK, N.J. QUAD. USGS TOPO, WEEHAWKEN, N.J.-N.Y. QUAD.

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
4920 York Road, Ste. 2CC2, P.O. Box 306, Holicong, PA 18928
612 Main Street, 2nd Floor, Boonton, NJ 07005

NOTICE ABOUT OVERSIZED MAP

THIS MAP CAN BE FOUND IN THE SITE FILE LOCATED AT: U.S. EPA SUPERFUND RECORDS CENTER, 290 BROADWAY, 18TH FLOOR, NY, NY 10007. TO MAKE AN APPOINTMENT TO VIEW THE MATERIAL PLEASE CONTACT THE RECORD CENTER AT (212) 637-4308.



877450047

TABLE

Table 1
Ground Water Sample Results for Monitoring Wells Located Along Saddle River
Purdue Pharma Technologies (formerly Napp Technologies, Inc.)
Lodi, New Jersey

Sample ID Laboratory ID Sample Date Matrix Unit of Measure	National Ambient Water Quality (NAWQ) Chronic Criteria ug/L	MW-E5 365499 07/25/02 WATER ug/L	MW-E5D 365497 07/25/02 WATER ug/L	MW-E5DD 365498 07/25/02 WATER ug/L	MW-E6 364554 07/22/02 WATER ug/L	MW-E12 365116 07/24/02 WATER ug/L	MW-E13 364550 07/22/02 WATER ug/L	MW-E13D 364551 07/22/02 WATER ug/L
VOLATILE ORGANICS GC (ug/L)								
Chloromethane	NL	2.2 U	43 U	43 U	0.4 U	0.4 U	22 U	0.4 U
Bromomethane	NL	1.6 U	32 U	32 U	0.3 U	0.3 U	16 U	0.3 U
Vinyl Chloride	NL	19	9,600	8,900	38	53	14 U	0.3 U
Chloroethane	NL	2.4 U	48 U	48 U	0.5 U	0.5 U	24 U	0.5 U
Methylene Chloride	2,200**	4.4 U	88 U	88 U	0.9 U	0.9 U	44 U	0.9 U
Trichlorofluoromethane	NL	2 U	41 U	41 U	0.4 U	0.4 U	20 U	0.4 U
1,1-Dichloroethene	25**	1.4 U	*29 U*	*29 U*	0.3 U	0.3 U	14 U	0.3 U
1,1-Dichloroethane	47**	1.7	**190**	**170**	0.3 U	4.4	14 U	0.3 U
trans-1,2-Dichloroethene	NL	1.2 U	38	42	1.5	0.2 U	12 U	0.2 U
cis-1,2-Dichloroethene	NL	30	9,700	9,400	90	7.7	16 U	4.5
Chloroform	28**	1.2 U	25 U	25 U	0.2 U	0.2 U	12 U	2.7
1,2-Dichloroethane	910**	1.8 U	36 U	36 U	0.4 U	0.4	18 U	0.4 U
1,1,1-Trichloroethane	11**	1.3 U	*26 U*	*26 U*	0.3 U	0.3 U	*13 U*	0.3 U
Carbon Tetrachloride	9.8**	1.5 U	*30 U*	*30 U*	0.3 U	0.3 U	*15 U*	5.3
Bromodichloromethane	NL	1 U	20 U	20 U	0.2 U	0.2 U	10 U	0.2 U
1,2-Dichloropropane	NL	1.8 U	35 U	35 U	0.4 U	0.4 U	18 U	0.4 U
cis-1,3-Dichloropropene	NL	1.5 U	30 U	30 U	0.3 U	0.3 U	15 U	0.3 U
Trichloroethene	47**	1.2	12 U	12 U	0.1 U	0.1 U	6 U	12
Dibromochloromethane	NL	1.4 U	27 U	27 U	0.3 U	0.3 U	14 U	0.3 U
1,1,2-Trichloroethane	1,200**	1.4 U	28 U	28 U	0.3 U	0.3 U	14 U	0.3 U
Benzene	130**	**180**	29 U	29 U	0.8	1.2	**1,100**	0.3 U
trans-1,3-Dichloropropene	NL	1.4 U	28 U	28 U	0.3 U	0.3 U	14 U	0.3 U
2-Chloroethyl Vinyl Ether	NL	2.4 U	47 U	47 U	0.5 U	0.5 U	24 U	0.5 U
Bromoform	NL	1.4 U	29 U	29 U	0.3 U	0.3 U	14 U	1.3
Tetrachloroethene	98**	1.2 U	24 U	24 U	0.2 U	0.2 U	12 U	1.2
1,1,2,2-Tetrachloroethane	610**	1.6 U	31 U	31 U	0.3 U	0.3 U	16 U	0.3 U
Toluene	9.8**	4.4	**200**	**210**	0.2 U	1.4	*12 U*	0.2 U
Chlorobenzene	64**	**870**	**1,200**	**1,100**	**98**	**120**	**5,800**	2.6
Ethylbenzene	7.3**	3.9	**30**	**20**	0.2 U	0.2 U	*7.5 U*	0.2 U
Xylene (Total)	13**	9.7	**75**	**52**	0.2 U	0.2 U	9 U	0.2 U
Total Target VOCs	NL	1,119.9	21,033	19,894	229.3	188.1	6,900	29.6
Total Nontarget VOCs	NL	48 (2)	ND	ND	53.1 (2)	19.5 (2)	ND	ND

Bold value indicates concentration exceeds criteria/standard.

Italicized value indicates method detection limit exceeds criteria/standard.

U = Not detected above indicated level

NT = Not Tested

ND = Not Detected

NL = Not Listed

*Recommended Water Quality Criteria for Freshwater- Criterion Continuous Concentration (EPA 4/99)

** NAWQ Tier II Values - Secondary Chronic Value (cited in Suter and Tsao. 1996)

Table 1
Ground Water Sample Results for Monitoring Wells Located Along Saddle River
Purdue Pharma Technologies (formerly Napp Technologies, Inc.)
Lodi, New Jersey

Sample ID	National Ambient	MW-E5	MW-E5D	MW-E5DD	MW-E6	MW-E12	MW-E13	MW-E13D
Laboratory ID	Water Quality	365499	365497	365498	364554	365116	364550	364551
Sample Date	(NAWQ)	07/25/02	07/25/02	07/25/02	07/22/02	07/24/02	07/22/02	07/22/02
Matrix	Chronic Criteria	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Unit of Measure	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
SEMI-VOLATILE ORGANICS GC (ug/L)								
Phenol	110**	0.9	0.6 U	0.3 U	0.3 U	0.3 U	2.8	0.3 U
2-Chlorophenol	NL	2.6	2.8 U	1.4 U	1.4 U	1.4 U	15	1.4 U
2-Nitrophenol	NL	1.2 U	2.4 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
2,4-Dimethylphenol	NL	1.5 U	3.1 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
2,4-Dichlorophenol	NL	2.1 U	4.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
4-Chloro-3-methylphenol	NL	2.0 U	4.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4,6-Trichlorophenol	NL	1.6 U	3.3 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
2,4-Dinitrophenol	NL	0.4 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-Nitrophenol	300**	0.8 U	1.6 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
4,6-Dinitro-2-methylphenol	NL	1.3 U	2.5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Pentachlorophenol	15*	1.2 U	2.3 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
N-Nitrosodimethylamine	NL	0.6 U	1.2 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
bis(2-Chloroethyl)ether	NL	0.6 U	1.2 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3-Dichlorobenzene	71**	0.8 U	24	22	0.8 U	1.8	4.2	0.8 U
1,4-Dichlorobenzene	15	3.7	86	75	5.3	7.2	19	0.8 U
1,2-Dichlorobenzene	910**	2.7	280	240	71	14	8.2	0.8 U
bis(2-chloroisopropyl)ether	NL	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-Nitroso-di-n-propylamine	NL	1.2 U	2.4 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Hexachloroethane	12	0.9 U	1.7 U	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U
Nitrobenzene	NL	0.8 U	1.5 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Isophorone	NL	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bis(2-Chloroethoxy)methane	NL	0.6 U	1.3 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2,4-Trichlorobenzene	NL	0.8 U	2.7	2.5	0.8 U	0.8 U	0.8 U	0.8 U
Naphthalene	12**	1.2	1.3 U	0.6 U	0.6 U	0.6 U	3.3	0.6 U
Hexachlorobutadiene	NL	1.2 U	2.3 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Hexachlorocyclopentadiene	NL	1.7 U	3.3 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
2-Chloronaphthalene	NL	0.8 U	1.6 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Dimethylphthalate	NL	0.5 U	1.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Acenaphthylene	NL	0.6 U	1.2 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2,6-Dinitrotoluene	NL	0.4 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Acenaphthene	23	0.6 U	1.1 U	0.6	0.6 U	0.6 U	0.6 U	0.6 U
2,4-Dinitrotoluene	NL	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Diethylphthalate	210**	0.4 U	0.9 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-Chlorophenyl-phenylether	NL	0.8 U	1.7 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Fluorene	3.9	0.6 U	1.2 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
4-Bromophenyl-phenylether	1.5	*1.9 U*	*3.8 U*	*1.9 U*	*1.9 U*	*1.9 U*	*1.9 U*	*1.9 U*
Hexachlorobenzene	NL	1.1 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Phenanthrene	6.3	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-Nitrosodiphenylamine	210**	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Bold value indicates concentration exceeds criteria/standard.

Italicized value indicates method detection limit exceeds criteria/standard.

*Recommended Water Quality Criteria for Freshwater- Criterion Continuous Concentration (EPA 4/99)

** NAWQ Tier II Values - Secondary Chronic Value (cited in Suter and Tsao. 1996)

J = Estimated Value

U = Not detected above indicated level

NT = Not Tested

ND = Not Detected

NL = Not Listed

Table 1
Ground Water Sample Results for Monitoring Wells Located Along Saddle River
Purdue Pharma Technologies (formerly Napp Technologies, Inc.)
Lodi, New Jersey

Sample ID Laboratory ID Sample Date Matrix Unit of Measure	National Ambient Water Quality (NAWQ) Chronic Criteria ug/L	MW-E5 365499 07/25/02 WATER ug/L	MW-E5D 365497 07/25/02 WATER ug/L	MW-E5DD 365498 07/25/02 WATER ug/L	MW-E6 364554 07/22/02 WATER ug/L	MW-E12 365116 07/24/02 WATER ug/L	MW-E13 364550 07/22/02 WATER ug/L	MW-E13D 364551 07/22/02 WATER ug/L
SEMI-VOLATILE ORGANICS GC (ug/L) (cont.)								
Anthracene	0.73**	0.4 U	*0.8 U*	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Di-n-butylphthalate	35**	0.4 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Fluoranthene	6.16	0.4 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Pyrene	NL	0.4 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Benzidine	3.9**	*25 U*	*49 U*	*25 U*	25 U	*25 U*	*25 U*	25 U
Butylbenzylphthalate	19	0.4 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
3,3'-Dichlorobenzidine	NL	1.3 U	2.6 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Benzo(a)anthracene	0.027**	*0.4 U*	*0.8 U*	*0.4 U*	*0.4 U*	*0.4 U*	*0.4 U*	*0.4 U*
Chrysene	NL	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bis(2-Ethylhexyl)phthalate	3**	0.4 U	0.9 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Di-n-octylphthalate	NL	0.1 U	0.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	NL	0.3 U	0.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Benzo(k)fluoranthene	NL	0.8 U	1.6 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Benzo(a)pyrene	0.014**	*0.2 U*	*0.3 U*	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*	*0.2 U*
Indeno(1,2,3-cd)pyrene	NL	0.1 U	0.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenz(a,h)anthracene	NL	0.6 U	1.3 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Benzo(g,h,i)perylene	NL	0.4 U	0.7 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Total Target Semi-VOCs	NL	11.1	392.7	340	76.3	23	52.5	ND
Total Nontarget Semi-VOCs	NL	3,418 (15)	1,224 (8)	1096	93.3 (2)	372 (3)	3,692.7 (23)	ND
Total PCBs	0.014*	*0.3 U*	*0.3 U*	*0.3 U*	*0.3 U*	*0.3 U*	*0.3 U*	*0.3 U*
PRIORITY METALS (ug/L)								
Antimony	30**	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Arsenic	150*	3.4 U	27.4	26.3	6.6	5.5	3.4 U	3.4 U
Barium	4**	**209**	**848**	**824**	**365**	**523**	**779**	**382**
Beryllium	0.66**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	2.2*	0.4 U	0.4 U	0.40 U	0.4 U	0.4 U	0.4 U	0.4 U
Chromium	74* (III Chromium)	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	3.8	2.8 U
Copper	9*	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.3	2.1 U
Iron	1,000*	**35,700**	**7,910**	NT	**3,480**	**10,700**	**9,070**	39.7 U
Lead	2.5*	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
Mercury	0.77*	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	52*	9.3	34.4	32.8	3.9 U	11.2 B	**56.2**	3.9 U
Selenium	5.0*	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Silver	0.36**	*0.7 U*	*0.7 U*	*0.70 U*	*0.7 U*	*0.7 U*	*0.7 U*	*0.7 U*
Thallium	12**	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U
Zinc	120*	5.8 U	6.6	7.3	5.8 U	5.9 B	7.1	5.8 U

Bold value indicates concentration exceeds criteria/standard.

Italicized value indicates method detection limit exceeds criteria/standard.

*Recommended Water Quality Criteria for Freshwater- Criterion Continuous Concentration (EPA 4/99)

** NAWQ Tier II Values - Secondary Chronic Value (cited in Suter and Tsao. 1996)

J = Estimated Value

U = Not detected above indicated level

NT = Not Tested

ND = Not Detected

NL = Not Listed

Table 2
Saddle River 1995, 1998 and 2002 Surface Water Sample Results Upstream, Adjacent and Downstream
Purdue Pharma Technologies (formerly Napp Technologies, Inc.)
Lodi, New Jersey

Sample ID	National Ambient Water Quality (NAWQ) Chronic Criteria	Sample 4 Upstream	Sample 5 Upstream	A-I 15259 Midland/River	15260 Midland/River	15261 Midland/River	Sample 3 Downstream	UP-1	UP-1	UP-2	UP-3	UP-4	UP-7	UP-8	UP-9
Laboratory ID		NA	NA	NA	NA	NA	NA	9505490	9505639	9505491	9505492	9505493	9505494	9505495	9505496
Sample Media		Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
Sample Date		4/21/1995	4/21/1995	4/21/1995	4/21/1995	4/21/1995	4/21/95(1)	4/24/95(2)	4/25/1995	4/24/1995	4/24/1995	4/24/1995	4/24/1995	4/24/1995	4/24/1995
Units of Measure	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds															
Acetone	1,500**	4.3	4.2	33	NT	NT	19	NT	1.8 U	NT	1.8 U	1.8 U	NT	NT	NT
Benzene	130**	1.0 U	1.0 U	1.4	NT	NT	1.5	NT	0.4 U	NT	0.7	0.8	NT	NT	NT
2-Butanone	14,000**	4.0 U	4.0 U	4.8	NT	NT	4.0 U	NT	0.4 U	NT	0.4 U	0.4 U	NT	NT	NT
Chlorobenzene	64**	1.0 U	1.0 U	2.5	NT	NT	3.3	NT	0.4 U	NT	5.9	6.3	NT	NT	NT
Chloroform	28**	1.0 U	1.0 U	2.6	NT	NT	1.2	NT	0.4 U	NT	0.4 U	0.4 U	NT	NT	NT
cis-1,2-Dichloroethene	NL	1.0 U	1.0 U	5.9	NT	NT	4.3	NT	0.4 U	NT	0.4 U	0.4 U	NT	NT	NT
4-Methyl-2-Pentanone	170**	2.0 U	2.0 U	1.0 J	NT	NT	2.0 U	NT	0.7 U	NT	0.7 U	0.7 U	NT	NT	NT
Methyl-Tertiary-Butylether	NL	1.2	1.1	1.5	NT	NT	1.2	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachloroethene	98**	1.0 U	1.0 U	1.0 U	NT	NT	1.0 U	NT	0.4 U	NT	0.4 U	0.4 U	NT	NT	NT
Toluene	9.8**	1.0 U	1.0 U	1.0	NT	NT	2.2	NT	0.5 U	NT	0.5 U	0.5 U	NT	NT	NT
Trichloroethene	47**	1.0 U	1.0 U	1.2	NT	NT	1.0 U	NT	0.4 U	NT	0.4 U	0.4 U	NT	NT	NT
Vinyl Chloride	NL	1.0 U	1.0 U	2.9	NT	NT	1.0 U	NT	2.0 U	NT	2.0 U	2.0 U	NT	NT	NT
Tentatively Identified Compounds	NL	ND	ND	ND	NT	NT	ND	NT	ND	NT	ND	ND	NT	NT	NT
Semivolatile Organic Compounds															
Bis(2-Ethylhexyl)phthalate	3**	2 J	1.5 J	NT	NT	*17* U	550 U	NT	*10* U	NT	NT	NT	*9* U	*9* U	*9* U
Di-n-butyl phthalate	35**	10 U	0.9 J	NT	NT	**61** B	*550* U	NT	10 U	NT	NT	NT	6 U	6 U	6 U
Di-n-octylphthalate	NL	10 U	0.9 J	NT	NT	12 J	550 U	NT	10 U	NT	NT	NT	5 U	5 U	5 U
Phenol	110**	10 U	10 U	NT	NT	1,200	3,200	NT	NT	NT	NT	NT	12 U	12 U	12 U
Napthalene	12**	1 U	1 U	2	NT	NT	2.1	NT	10 U	NT	NT	NT	6 U	6 U	6 U
Tentatively Identified Compounds	NL	NT	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	79	84	89
Metals															
Aluminum	87*	240	270	NT	990	NT	640	*200* U	*200* U	*300* U	NT	NT	NT	NT	NT
Arsenic	150*	2.2 U	2.2 U	NT	2.2 U	NT	2.4	8 U	0.8	NR U	NT	NT	NT	NT	NT
Barium	4**	90	89	NT	94	NT	100	106	109	99.2	NT	NT	NT	NT	NT
Cadmium	2.2*	*3* U	*3* U	NT	*3* U	NT	*3* U	*10* U	*10* U	*10* U	NT	NT	NT	NT	NT
Calcium	NL	51,000	51,000	NT	58,000	NT	55,000	64,100	63,400	60,900	NT	NT	NT	NT	NT
Chromium	74* (III Chromium)	5 U	5 U	NT	5 U	NT	5 U	30 U	30 U	30 U	NT	NT	NT	NT	NT
Copper	9*	13	16	NT	27	NT	35	*30* U	39.3	*30* U	NT	NT	NT	NT	NT
Iron	1,000*	430	480	NT	810	NT	630	340	298	310	NT	NT	NT	NT	NT
Lead	2.5*	NR	NR	NT	NR	NT	NR	*10* U	244	*300* U	NT	NT	NT	NT	NT
Magnesium	NL	14,000	14,000	NT	16,000	NT	24,000	17,500	17,100	16,800	NT	NT	NT	NT	NT
Manganese	120**	150	140	NT	220	NT	170	135	112	128	NT	NT	NT	NT	NT
Potassium	NL	4,200	4,500	NT	11,000	NT	5,500	5,470	4,960	5,090	NT	NT	NT	NT	NT
Silver	0.36**	*5* U	*5* U	NT	*5* U	NT	19	*10* U	*10* U	*10* U	NT	NT	NT	NT	NT
Sodium	NL	50,000	51,000	NT	78,000	NT	66,000	60,600	58,600	56,100	NT	NT	NT	NT	NT
Zinc	120*	21	39	NT	43	NT	110	100 U	149	100 U	NT	NT	NT	NT	NT
PCBs (Total)	0.014*	*0.27* U	*0.25* U	*0.42* U	NT	NT	*0.24* U	NT	*0.5* U	NT	NT	NT	NT	NT	NT
Pesticides															
Dieldrin	0.056*	NR	NR	NT	NT	NT	NR	NT	*0.5* U	NR	NT	NT	NT	NT	NT

Bold value indicates concentration exceeds criteria.
Italicized value indicates method detection limit exceeds criteria.
J = Estimated Value
U = Not detected above indicated level
NT = Not Tested
NL = Not listed
*Recommended Water Quality Criteria for Freshwater- Criterion Continuous Concentration (EPA 4/99)
** NAWQ Tier II Values - Secondary Chronic Value (cited in Suter and Tsao, 1996)
4/25/95 and 4/26/95 samples analyzed for VOCs and SVOC-only detected compounds reported.
(1) 4/21/95 sample locations unknown.
(2) 4/24 & 4/25/95: Up 1-9 and Downstream 1-9 collected approximately 15' upstream and downstream respectively of site outfall.
(3) SW-1 through SW-6 locations correspond to SW-1 through SW-6 on Figure 3.

Table 2
Saddle River 1995, 1998 and 2002 Surface Water Sample Results Upstream, Adjacent and Downstream
Purdue Pharma Technologies (formerly Napp Technologies, Inc.)
Lodi, New Jersey

Sample ID	National Ambient Water Quality (NAWQ) Chronic Criteria	DOWN-1	DOWN-2	DOWN-2	DOWN-3	DOWN-3 (Dup)	DOWN-4	DOWN-4 (Dup)	DOWN-7	DOWN-8	DOWN-9	SW-5 (Upstream)	SW-5D (Upstream)	SW-6 (Upstream)	SW-2 (Adjacent)
Laboratory ID		9505497	9505498	9505640	9505499	9505641	9505500	9505642	9505501	9505502	9505503	71898	71899	71900	71895
Sample Media		Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
Sample Date		4/24/1995	4/24/1995	4/25/1995	4/24/1995	4/25/1995	4/24/1995	4/25/1995	4/24/1995	4/24/1995	4/24/1995	07/16/98	07/16/98	07/16/98	07/16/98
Units of Measure	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds															
Acetone	1,500**	NT	NT	1.7 J	1.8 U	2.0	1.7 J	1.8 U	NT	NT	NT	NT	NT	NT	NT
Benzene	130**	NT	NT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NT	NT	NT	0.6	0.6	0.3	0.3
2-Butanone	14,000**	NT	NT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NT	NT	NT	NT	NT	NT	NT
Chlorobenzene	64**	NT	NT	3.0	2.3	3.0	2.4	2.8	NT	NT	NT	2.7	2.9	1.8	1.6
Chloroform	28**	NT	NT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NT	NT	NT	0.3	0.3	0.3	0.3
cis-1,2-Dichloroethene	NL	NT	NT	1.3	0.4 U	1.4	0.4 U	1.3	NT	NT	NT	1.0 U	1.0 U	1.0 U	NT
4-Methyl-2-Pentanone	170**	NT	NT	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	NT	NT	NT	NT	NT	NT	NT
Methyl-Tertiary-Butylether	NL	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachloroethene	96**	NT	NT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NT	NT	NT	0.6	0.6	0.7	0.6
Toluene	9.8**	NT	NT	1.9	0.5 U	2.8	0.5 U	1.6	NT	NT	NT	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	47**	NT	NT	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NT	NT	NT	0.4 U	0.4 U	0.4 U	0.4 U
Vinyl Chloride	NL	NT	NT	2.0 U	2.0 U	2.0 U	2.0 U	0.8 U	NT	NT	NT	0.4 U	0.4 U	0.4 U	0.4 U
Tentatively Identified Compounds	NL	NT	NT	ND	17.8	ND	ND	ND	NT	NT	NT	ND	ND	ND	ND
Semivolatile Organic Compounds															
Bis(2-Ethylhexyl)phthalate	3**	NT	NT	10 U	NT	*10 U*	NT	*10 U*	*9 U*	*9 U*	*9 U*	NT	NT	NT	NT
Di-n-butyl phthalate	35**	NT	NT	10 U	NT	10 U	NT	10 U	6 U	6 U	6 U	NT	NT	NT	NT
Di-n-octylphthalate	NL	NT	NT	10 U	NT	10 U	NT	10 U	5 U	5 U	5 U	NT	NT	NT	NT
Phenol	110**	NT	NT	NT	NT	NT	NT	NT	12 U	12 U	12 U	1.2 U	1.1 U	1.1 U	1.2 U
Napthalene	12**	NT	NT	10 U	NT	10 U	NT	10 U	6 U	6 U	6 U	NT	NT	NT	NT
Tentatively Identified Compounds	NL	NT	NT	ND	NT	ND	NT	ND	135	140	135	NT	NT	NT	NT
Metals															
Aluminum	87*	*200 U*	*300 U*	*200 U*	NT	*200 U*	NT	*200 U*	NT	NT	NT	NT	NT	NT	NT
Arsenic	150*	8 U	NT	8 U	NT	8 U	NT	8 U	NT	NT	NT	3.8 U	3.8 U	3.8 U	3.8 U
Barium	4**	97	96	106	NT	101	NT	62	NT	NT	NT	NT	NT	NT	NT
Cadmium	2.2*	*10 U*	NT	*10 U*	NT	*10 U*	NT	12.1	NT	NT	NT	0.40 U	0.40 U	0.40 U	0.4 U
Calcium	NL	59,900	62,700	64,700	NT	62,100	NT	34,700	NT	NT	NT	66,200	66,400	65,900	63,300
Chromium	74* (III Chromium)	30 U	30 U	30 U	NT	30 U	NT	30 U	NT	NT	NT	8.5	1.0 U	1.0 U	1 U
Copper	9*	*30 U*	*30 U*	*30 U*	NT	30.5	NT	*30 U*	NT	NT	NT	12.0	11.6	12.9	11.4
Iron	1,000*	304	284	291	NT	287	NT	219	NT	NT	NT	NT	NT	NT	NT
Lead	2.5*	*10 U*	*300 U*	140	NT	10 U	NT	10 U	NT	NT	NT	NT	NT	NT	NR
Magnesium	NL	16,400	17,200	17,300	NT	16,600	NT	8,790	NT	NT	NT	19,500	19,100	19,000	18,100
Manganese	120**	148	141	95.3	NT	86	NT	55	NT	NT	NT	NT	NT	NT	NT
Potassium	NL	4,780	5,080	5,140	NT	4,850	NT	2,000 U	NT	NT	NT	NT	NT	NT	NT
Silver	0.36**	*10 U*	*10 U*	*10 U*	NT	*10 U*	NT	*10 U*	NT	NT	NT	NT	NT	NT	NR
Sodium	NL	55,000	57,300	59,900	NT	57,300	NT	31,700	NT	NT	NT	NT	NT	NT	NT
Zinc	120*	100 U	100 U	100 U	NT	100 U	NT	100 U	NT	NT	NT	23	23.4	22.6	25.4
PCBs (Total)	0.014*	NT	NT	*0.5 U*	NT	*0.5 U*	NT	*0.5 U*	NT	NT	NT	*0.4 U*	*0.4 U*	*0.4 U*	ND
Pesticides															
Dieldrin	0.056*	NT	NT	0.044 J	NT	0.041	NT	0.043	NT	NT	NT	NT	NT	NT	NT

Bold value indicates concentration exceeds criteria.
Italicized value indicates method detection limit exceeds criteria.
J = Estimated Value
U = Not detected above indicated level
NT = Not Tested
NL = Not listed
*Recommended Water Quality Criteria for Freshwater- Criterion Continuous Concentration (EPA 4/99)
** NAWQ Tier II Values - Secondary Chronic Value (cited in Suter and Tsao, 1996)
4/25/95 and 4/26/95 samples analyzed for VOCs and SVOC-only detected compounds reported.
(1) 4/21/95 sample locations unknown.
(2) 4/24 & 4/25/95: Up 1-9 and Downstream 1-9 collected approximately 15' upstream and downstream respectively of site outfall.
(3) SW-1 through SW-6 locations correspond to SW-1 through SW-6 on Figure 3.

Table 2
Saddle River 1995, 1998 and 2002 Surface Water Sample Results Upstream, Adjacent and Downstream
Purdue Pharma Technologies (formerly Napp Technologies, Inc.)
Lodi, New Jersey

Sample ID Laboratory ID Sample Media Sample Date Units of Measure	National Ambient Water Quality (NAWQ) Chronic Criteria ug/L	SW-3 (Adjacent) 71896 Aqueous 07/16/98 ug/L	SW-4 (Adjacent) 71897 Aqueous 07/16/98 ug/L	SW-1 (Downstream) 71894 Aqueous 07/16/98 ug/L	SW-5 (Upstream) 341118 Aqueous 03/28/02 ug/L	SW-6 (Upstream) 341119 Aqueous 03/28/02 ug/L	SW-5 (Upstream) 341118 Aqueous 03/28/02 ug/L	SW-6 (Upstream) 341119 Aqueous 03/28/02 ug/L	SW-2 (Adjacent) 341115 Aqueous 03/28/02 ug/L	SW-3 (Adjacent) 341116 Aqueous 03/28/02 ug/L	SW-4 (Adjacent) 341117 Aqueous 03/28/02 ug/L	SW-1 (Downstream) 341114 Aqueous 03/28/02 ug/L	SW-7 (Downstream) 341113 Aqueous 03/28/02 ug/L	SW-8 (Downstream) 341112 Aqueous 03/28/02 ug/L	SW-9 (Dup) 341120 Aqueous 03/28/02 ug/L
Volatile Organic Compounds															
Acetone	1,500**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	130**	1.1	0.8	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5	0.4	0.3	0.2	0.2	0.2 U
2-Butanone	14,000**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorobenzene	64**	3.6	3.0	1.3	0.9	0.5	0.9	0.5	1.4	2.8	2.5	1.6	1.2	1.6	0.4
Chloroform	28**	0.2	0.3	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	NL	1.0 U	1.0 U	1.0 U	0.3	0.2 U	0.3	0.2 U	0.3	0.3	0.3	0.5	0.4	2.6	0.3
4-Methyl-2-Pentanone	170**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Methyl-Tertiary-Butylether	NL	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachloroethene	98**	0.6	0.6	0.6	1.3	1.2	1.3	1.2	1.1	1.1	1.2	1.2	1.2	1.1	1.2
Toluene	9.8**	5.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	47**	0.4 U	0.4 U	0.4 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Vinyl Chloride	NL	0.4 U	0.4 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.7	0.2 U
Tentatively Identified Compounds	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatile Organic Compounds															
Bis(2-Ethylhexyl)phthalate	3**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Di-n-butyl phthalate	35**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Di-n-octylphthalate	NL	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Phenol	110**	1.1 U	1.4 U	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Napthalene	12**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tentatively Identified Compounds	NL	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Metals															
Aluminum	87*	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Arsenic	150*	3.8 U	3.8 U	3.8 U	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Barium	4**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Cadmium	2.2*	0.40 U	0.40 U	0.40 U	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Calcium	NL	66,200	73,000	66,700	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chromium	74* (III Chromium)	1.0 U	1.0 U	1.0 U	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Copper	9*	11.4	13.8	12.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Iron	1,000*	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Lead	2.5*	NT	NT	NT	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.5
Magnesium	NL	19,000	21,000	19,100	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Manganese	120**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Potassium	NL	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Silver	0.36**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sodium	NL	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Zinc	120*	22.8	24.6	23.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
PCBs (Total)	0.014*	*0.4 U*	*0.4 U*	*0.4 U*	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pesticides															
Dieldrin	0.056*	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

Bold value indicates concentration exceeds criteria.
Italicized value indicates method detection limit exceeds criteria.
J = Estimated Value
U = Not detected above indicated level
NT = Not Tested
NL = Not listed
*Recommended Water Quality Criteria for Freshwater- Criterion Continuous Concentration (EPA 4/98)
** NAWQ Tier II Values - Secondary Chronic Value (cited in Suter and Tsao, 1996)
4/25/95 and 4/26/95 samples analyzed for VOCs and SVOC-only detected compounds reported.
(1) 4/21/95 sample locations unknown.
(2) 4/24 & 4/25/95: Up 1-9 and Downstream 1-8 collected approximately 15' upstream and downstream respectively of site outfall.
(3) SW-1 through SW-8 locations correspond to SW-1 through SW-8 on Figure 3.

Table 3
Saddle River 1995, 1998, 1998 and 2002 Sediment Sample Results Upstream, Adjacent and Downstream
Purdue Pharma Technologies (formerly Napp Technologies, Inc.)
Lodi, New Jersey

Sample ID Laboratory ID Sample Media Sample Date Sample Depth Units Of Measure	EPA ARCS No Effects Concentration Sediment Benchmarks* mg/kg	SED-UP 23882 SEDIMENT 4/28/1995 0-0.5 mg/kg	SED-DOWN 23881 SEDIMENT 4/28/1995 0-0.5 mg/kg	P-1 Upstream 63789 SEDIMENT 9/27/1996 0-0.5 mg/kg	P-2 Outfall 63790 SEDIMENT 9/27/1996 0-0.5 mg/kg	P-3 Downstream 63791 SEDIMENT 9/27/1996 0-0.5 mg/kg	Sed-5a Upstream 71911 Sediment 7/16/1998 0-0.3 mg/kg	Sed-5b Upstream 71912 Sediment 7/16/1998 0.3-0.6 mg/kg	Sed-2a (Adjacent) 71904 Sediment 7/16/1998 0-0.3 mg/kg	Sed-2b (Adjacent) 71905 Sediment 7/16/1998 0.3-0.6 mg/kg	Sed-3a (Adjacent) 71907 Sediment 7/16/1998 0-0.3 mg/kg	Sed-3b (Adjacent) 71908 Sediment 7/16/1998 0.3-0.6 mg/kg	Sed-4a (Adjacent) 71909 Sediment 7/16/1998 0-0.3 mg/kg	Sed-4b (Adjacent) 71910 Sediment 7/16/1998 0.3-0.6 mg/kg	SED-8 (Upstream) 341091 Sediment 03/28/02 0-0.5 mg/kg	SED-9 (Dup) (Upstream) 341092 Sediment 03/28/02 0-0.5 mg/kg	SED-1 (Adjacent) 341086 Sediment 03/28/02 0-0.5 mg/kg	SED-2 (Adjacent) 341087 Sediment 03/28/02 0-0.5 mg/kg	SED-3 (Adjacent) 341088 Sediment 03/28/02 0-0.5 mg/kg	SED-4 (Adjacent) 341089 Sediment 03/28/02 0-0.5 mg/kg	SED-5 (Adjacent) 341090 Sediment 03/28/02 0-0.5 mg/kg
Semivolatile Organics																				
Acenaphthene	NL	NT	NT	0.02 U	0.02 U	0.14	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Acenaphthylene	NL	NT	NT	0.02 U	0.04	0.019 J	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Anthracene	1.7	NT	NT	0.03	0.028	0.16	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzo(a)anthracene	3.5	NT	NT	0.21	0.1	0.53	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzo(a)pyrene	0.44	NT	NT	0.22	0.11	0.56	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzo(b)fluoranthene	NL	NT	NT	0.29	0.12	0.79	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzo(g,h,i)perylene	3.8	NT	NT	0.098	0.047	0.21	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzo(k)fluoranthene	NL	NT	NT	0.13	0.049	0.33	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
bis(2-Ethylhexyl)phthalate	NL	NT	NT	0.18 B	0.14 B	0.17 B	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Carbazole	NL	NT	NT	0.042 J	0.4 U	0.17 J	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chrysene	4	NT	NT	0.3	0.12	0.75	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Dibenzofuran	NL	NT	NT	0.4 U	0.4 U	0.11 J	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fluoranthene	7.5	NT	NT	0.58	0.22	1.8	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fluorene	1.8	NT	NT	0.02 U	0.02 U	0.18	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Indeno(1,2,3-cd)pyrene	3.8	NT	NT	0.12	0.045	0.23	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Methylnaphthalene	NL	NT	NT	0.4 U	0.4 U	0.024 J	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Phenanthrene	NL	NT	NT	0.27	0.11	1.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pyrene	6.1	NT	NT	0.53	0.22	1.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Phenol	NL	5 U	5 U	6 U	6.1 U	6.2 U	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SVOC TICs		ND	ND	1.03	3.27	1.41	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Metals																				
Alimony	NL	NT	NT	NT	NT	NT	1.4 B	1.2 U	1.4 B	1.2 U	1.2 B	1.3 B	1.1 B	1.2 B	NT	NT	NT	NT	NT	NT
Arsenic	92.9	NT	NT	NT	NT	NT	3.3	0.75 B	1.2 B	0.79 U	2.2	1.6	1 B	2.1	NT	NT	NT	NT	NT	NT
Beryllium	NL	NT	NT	NT	NT	NT	0.05 B	0.054 U	0.1 B	0.06 B	0.25 B	0.1 B	0.09 B	0.054 U	NT	NT	NT	NT	NT	NT
Cadmium	41.1	NT	NT	0.096 U	0.097 U	0.099 U	0.11 U	0.11 U	NT	0.17 B	0.1 U	0.12 U	0.1 U	0.11 U	NT	NT	NT	NT	NT	NT
Calcium	NL	NT	NT	NT	NT	NT	NT	NT	10.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chromium	312	NT	NT	NT	NT	NT	22.3	4.3	31.2	6.4	14.8	8.8	7.1	5.8	NT	NT	NT	NT	NT	NT
Copper	54.8	NT	NT	NT	NT	NT	79.4	8.5	29	16.4	11.3	17.3	31.1	80.1	NT	NT	NT	NT	NT	NT
Lead	66.7	NT	NT	NT	NT	NT	29.9	3	NT	22.9	51.4	78.7	19.3	11.7	NT	NT	NT	NT	NT	NT
Magnesium	NL	NT	NT	NT	NT	NT	NT	NT	0.06	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Mercury	NL	NT	NT	NT	NT	NT	0.19	0.022 U	7.2 B	0.03 B	0.04 B	0.04 B	0.05	0.04 B	NT	NT	NT	NT	NT	NT
Nickel	37.9	NT	NT	NT	NT	NT	22.9	4.2 B	1.2 U	5.4 B	13.8	7.1 B	6.7 B	6.4 B	NT	NT	NT	NT	NT	NT
Selenium	NL	NT	NT	NT	NT	NT	1.1 U	1.1 U	0.4 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	NT	NT	NT	NT	NT	NT
Silver	NL	NT	NT	NT	NT	NT	0.36 U	0.36 U	1.3 U	0.4 U	0.37 U	0.4 U	0.36 U	0.36 U	NT	NT	NT	NT	NT	NT
Thallium	NL	NT	NT	NT	NT	NT	0.12 U	1.2 U	78.9	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	NT	NT	NT	NT	NT	NT
Zinc	541	NT	NT	NT	NT	NT	65.7	14.1	NT	55.3	108	37.9	71.1	58.3	NT	NT	NT	NT	NT	NT
PCBs																				
Aroclor-1016	NL	NT	NT	NT	NT	NT	0.091 U	0.09 U	0.095 U	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1221	NL	NT	NT	NT	NT	NT	0.091 U	0.09 U	0.095 U	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1232	NL	NT	NT	NT	NT	NT	0.091 U	0.09 U	0.095 U	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1242	NL	NT	NT	NT	NT	NT	0.39	0.09 U	0.17	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1248	NL	NT	NT	NT	NT	NT	0.091 U	0.09 U	0.095 U	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1254	NL	NT	NT	NT	NT	NT	0.82	0.09 U	0.19	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1260	NL	NT	NT	NT	NT	NT	0.091 U	0.09 U	0.095 U	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1262	NL	NT	NT	NT	NT	NT	0.091 U	0.09 U	0.095 U	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Aroclor-1268	NL	NT	NT	NT	NT	NT	0.091 U	0.09 U	0.095 U	0.095 U	0.088 U	0.096 U	0.086 U	0.09 U	0.089 U	0.089 U	0.096 U	0.089 U	0.082 U	0.086 U	0.088 U
Total PCBs	0.194	0.2	0.96 U	0.16	0.081 U	0.083 U	1.21	ND	0.36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Bold value indicates concentration exceeds criteria.

Italicized value indicates method detection limit exceeds criteria.

*Assessment and Remediation of Contaminated Sediments Program (cited in Jones et al. 1997)

SED-9 is a duplicate of SED-8

Notes:
J = Estimated value
U = Not detected above level indicated
NT = Not Tested
ND = Not Detected
NL = Not Listed
NA = Information Not Available